

Math 221 Calculus and Analytic Geometry

Textbook as of Fall 2002: *Calculus, 8th Edition, by Varberg, Purcell, Rigdon* published by Prentice-Hall. The University Bookstore sells it bundled with the student solution manual (odd exercises only) and a Maple Manual. The adoption of this new text progresses with the Calculus sequence starting with 221 in Fall 2002, then 222 in the Spring 2003 and 234 in Fall 2003.

The material is Chapters 2 through 7 + sections 9.1, 9.2 (L'Hôpital's rule). Chapter 1 is prerequisites but it is strongly recommended that you review sections 1.5, 1.6 (Cartesian coordinates, Pythagoras, equations of a line, equation of a circle). It's also a good idea to assign exercises throughout this section, especially sections 1.3, 1.4 (inequalities, absolute values) in preparation for ϵ 's and δ 's.

The Calculus committee thought that this book was clear, reasonably well-organized and concise (compared to most Calc books on the market). Note the "concepts review", "chapter review" and "sample test problems" at the end of each chapter. One peculiarity is that L'Hôpital's rule is covered in 9.1 and 9.2. It is better to cover 9.1 right after Chapter 4 and the mean value theorem and 9.2 while covering Chapter 7. L'Hôpital's rule is very useful to evaluate important limits involving exponentials and logs (e.g. $\lim_{x \rightarrow 0} x^n \ln x$, $\lim_{x \rightarrow \infty} x^n / e^x$).

Many students have seen L'Hôpital's rule in high school, it's a recipe they can (and do) use without thinking... Another peculiarity is the three different notations used for the derivative in chapter 3.

Approximate Schedule for 221:

Week 1

1.5,6 *Coordinates, lines, circles* **2.1,2,3** *Functions and graphs, operations on functions, trig functions*

Weeks 2 and 3 (1.5 to 2 weeks)

2.4,5,6,7 *Limits, $\epsilon - \delta$, trig limits* **2.8,9** *Limits at Infinity, Infinite Limits, Continuity*

Weeks 3 and 4 (1 to 1.5 weeks)

3.1,2,3,4 *Derivatives*

Week 5

3.5,6,7 *Chain rule, Leibniz notation, Higher order derivatives*

Week 6

3.8,9,10 *Implicit Differentiation, Related rates, Approximations*

Weeks 7 and 8

4.1-4.7 *Applications of the Derivative* **9.1** *L'Hôpital's Rule* (Not logs and exponentials yet)

Week 9

5.1,2 *Antiderivatives, Indefinite Integrals and Intro to Differential equations*

Week 10

5.3,4,5 *Sums, Areas and the Definite Integral*

Week 11

5.6,7,8 *Fundamental Theorem. Substitution rule for both indefinite and definite integrals*

Week 12

6.1,2,3 *Applications of the integral, Areas and Volumes*

Weeks 13 and 14

7.1-7.7 *Transcendental functions* **9.1,2** *Limits involving logs, exponentials and powers*

7.8 *Hyperbolic functions (optional)*

Week 15

Finish-up, review